

6/19/96-01510

**TOUR OF NORFOLK NAVAL BASE
IR SITES
June 19, 1996**

ACTIVE SITES:

1) CAMP ALLEN LANDFILL

Site A

Operated 1940's - 1975; Municipal Solid Wastes
GWTP/Dual-Phase Vapor Extraction - Summer 1997

Site B

One-time disposal of fire debris in 1971
Removal Action - 1994

2) CAMP ALLEN SALVAGE YARD

Operated since 1940's; Past storage of hazardous materials
Scrap metal storage
RI/FS Fieldwork - 1996

3) CD LANDFILL

Operated 1974 - 1986
Non-hazardous waste landfill
PRAP/Decision Document - 1996; Cleanup late 1996/1997

4) Q AREA DRUM STORAGE YARD

Operated 1950's - 1980's
Storage of hazardous materials; Paint thinners, Petroleum products
RI/FS, PRAP/Decision Document - June 1996; Cleanup late 1996/1997

5) BUILDING W-316

Site still in use
PCB Storage Area
PA/SI Fieldwork - 1996

6) PESTICIDE DISPOSAL SITE

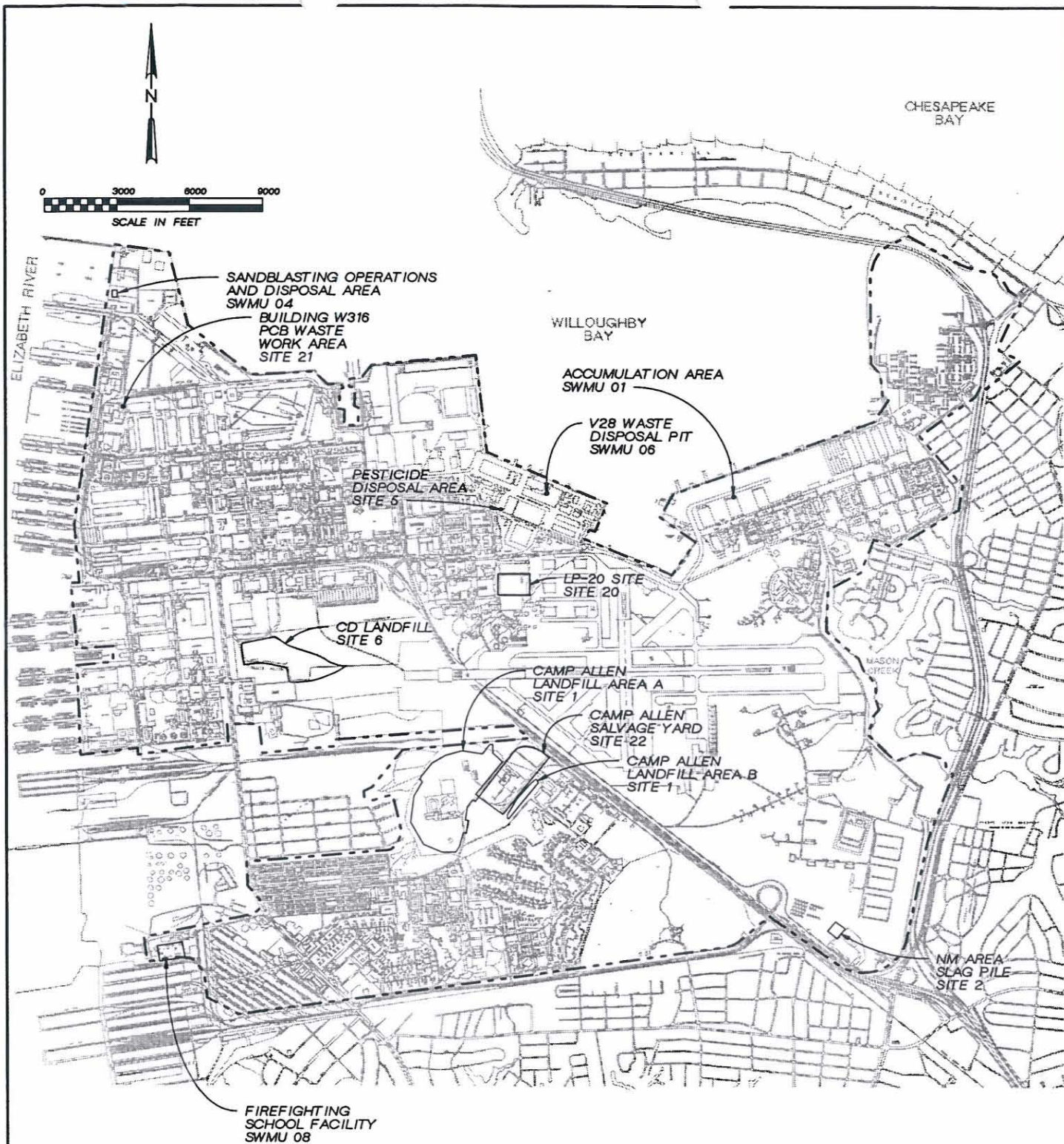
Operated 1960's - 1973
Soil near drain is contaminated
RI/FS Fieldwork - 1996

7) BUILDING LP-20

Operated by NADEP, past Aircraft maintenance shop
Groundwater contaminated with solvents
RI/FS, PRAP/Decision Document - June 1996; Cleanup 1997

8) NM SLAG PILE

Operated 1950's - 1960's
Steel disposal site
RI/FS Fieldwork - 1996

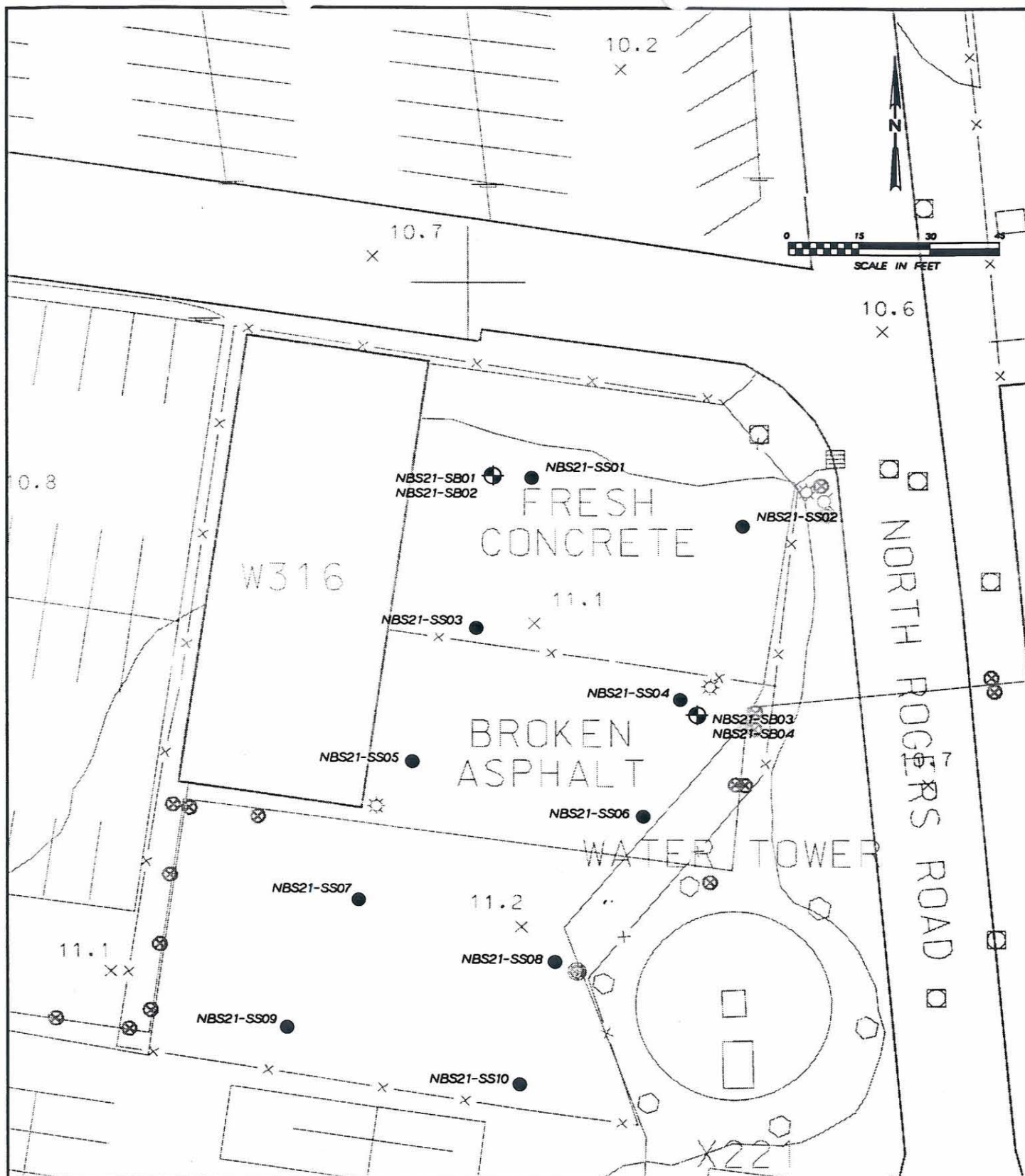


LEGEND

----- INSTALLATION PROPERTY BOUNDARY

Figure 1-1
INSTALLATION LOCATION MAP
Naval Base, Norfolk





LEGEND



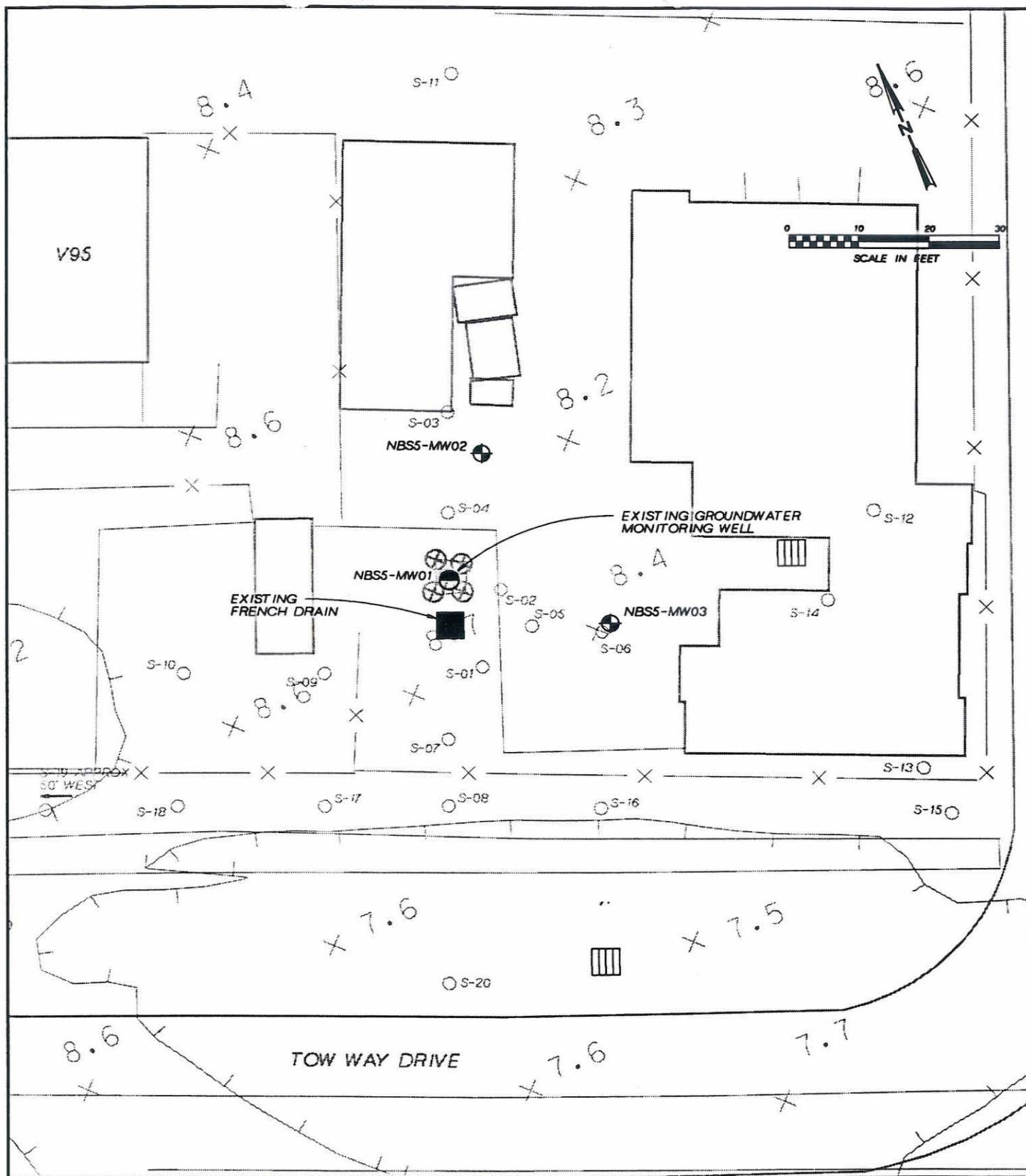
- 
 PROPOSED GROUNDWATER MONITORING WELL LOCATION*
- 
 PROPOSED SOIL SAMPLING LOCATION*
- * LOCATIONS SUBJECT TO CHANGE BASED UPON INTERVIEW WITH BASE PERSONNEL

Figure 1-2
 PROPOSED SOIL SAMPLING LOCATIONS
 SITE 21 - BUILDING W316,
 PCB WASTE WORK AREA
 Naval Base, Norfolk





LEGEND





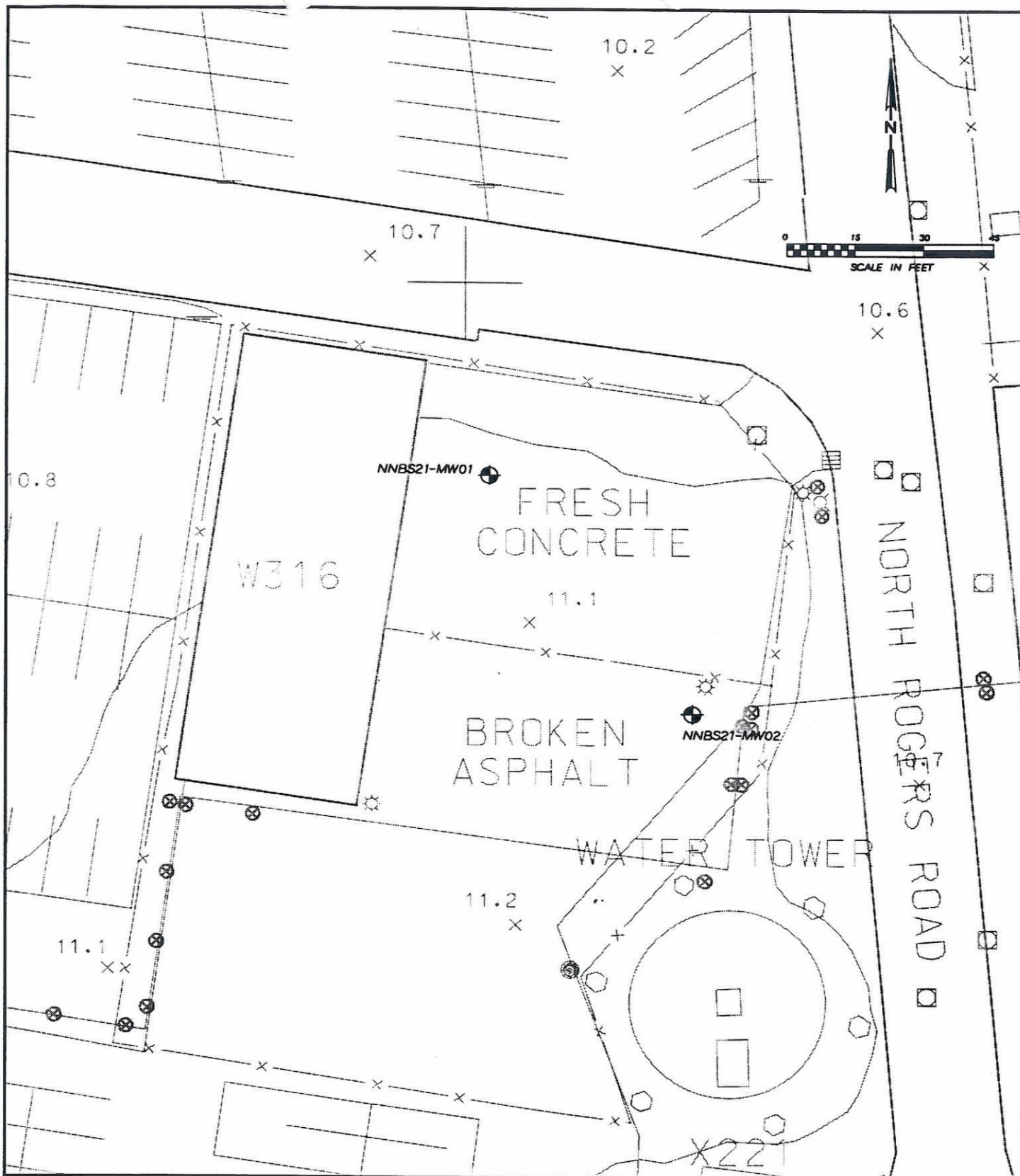
-  PROPOSED GROUNDWATER MONITORING WELL LOCATION
-  EXISTING GROUNDWATER MONITORING WELL LOCATION
-  SOIL SAMPLING LOCATION - PIRNIE RI
-  FRENCH DRAIN

Figure 1-3
PROPOSED GROUNDWATER
SAMPLING LOCATIONS
SITE 5 - PESTICIDE DISPOSAL AREA
Naval Base, Norfolk





LEGEND

 PROPOSED GROUNDWATER MONITORING WELL LOCATION*

* LOCATIONS SUBJECT TO CHANGE
 BASED UPON INTERVIEW WITH
 BASE PERSONNEL

Figure 1-4
 PROPOSED GROUNDWATER
 SAMPLING LOCATIONS
 SITE 21 - BUILDING W316,
 PCB WASTE WORK AREA
 Naval Base, Norfolk

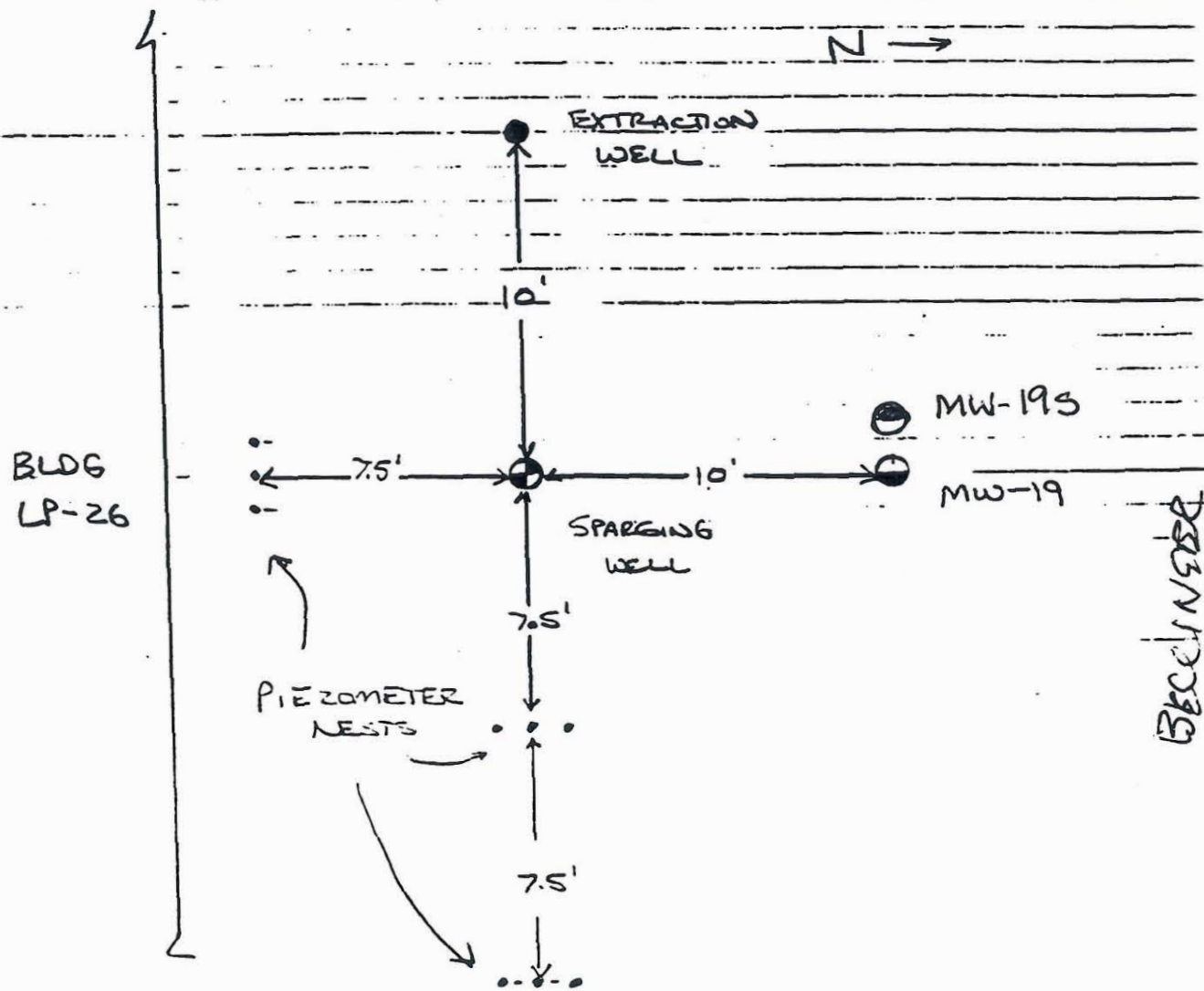


Table 1-2
SOIL SAMPLING PROGRAM FOR SITE 5 RI/FS AND SITE 21 PA/SI

Site	Sampling Location	TCL VOC	TCL SVOC	TCL Pest/PCB	TCL PCB	TAL Metals and Cyanide (total)
Site 5	NNBS05-SB01	X	X	X		X
Site 5	NNBS05-SB02	X	X	X		X
Site 5	NNBS05-SB03	X	X	X		X
Site 5	NNBS05-SB04	X	X	X		X
Site 5	NNBS05-SB05	X	X	X		X
Site 5	NNBS05-SB06	X	X	X		X
Site 5	NNBS05-SS01	X	X	X		X
Site 5	NNBS05-SS02	X	X	X		X
Site 5	NNBS05-SS03	X	X	X		X
Site 5	NNBS05-SS04	X	X	X		X
Site 21	NNBS21-SB01				X	
Site 21	NNBS21-SB02				X	
Site 21	NNBS21-SB03				X	
Site 21	NNBS21-SB04				X	
Site 21	NNBS21-SS01				X	
Site 21	NNBS21-SS02				X	
Site 21	NNBS21-SS03				X	
Site 21	NNBS21-SS04				X	
Site 21	NNBS21-SS05				X	
Site 21	NNBS21-SS06				X	
Site 21	NNBS21-SS07				X	
Site 21	NNBS21-SS08				X	
Site 21	NNBS21-SS09				X	
Site 21	NNBS21-SS10				X	

Table 1-3 GROUNDWATER AND SURFACE WATER SAMPLING PROGRAM FOR SITE 5 RI/FS AND SITE 21 PA/SI							
Site	Sampling Location	TCL VOC	TCL SVOC	Pest/ PCB	PCB (filtered)	PCB (unfiltered)	TAL Metals and Cyanide (total)
Site 5	NNBS05-MW01	X	X	X			X
Site 5	NNBS05-MW02	X	X	X			X
Site 5	NNBS05-MW03	X	X	X			X
Site 21	NNBS21-MW01				X	X	
Site 21	NNBS21-MW02				X	X	

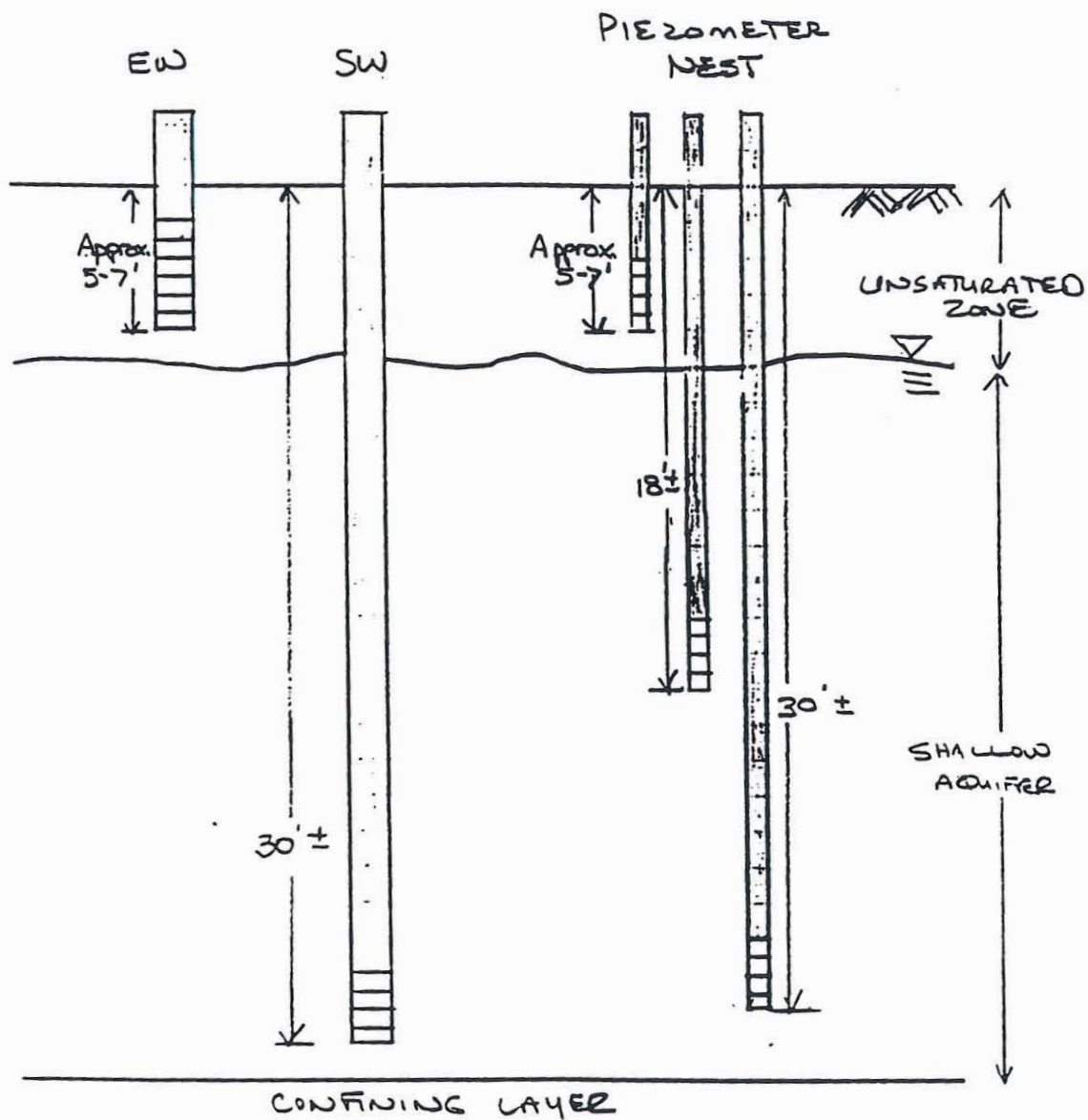
[illegible] Baker Environmental, Inc.



SCALE 1" = 5'

FIGURE 4-1

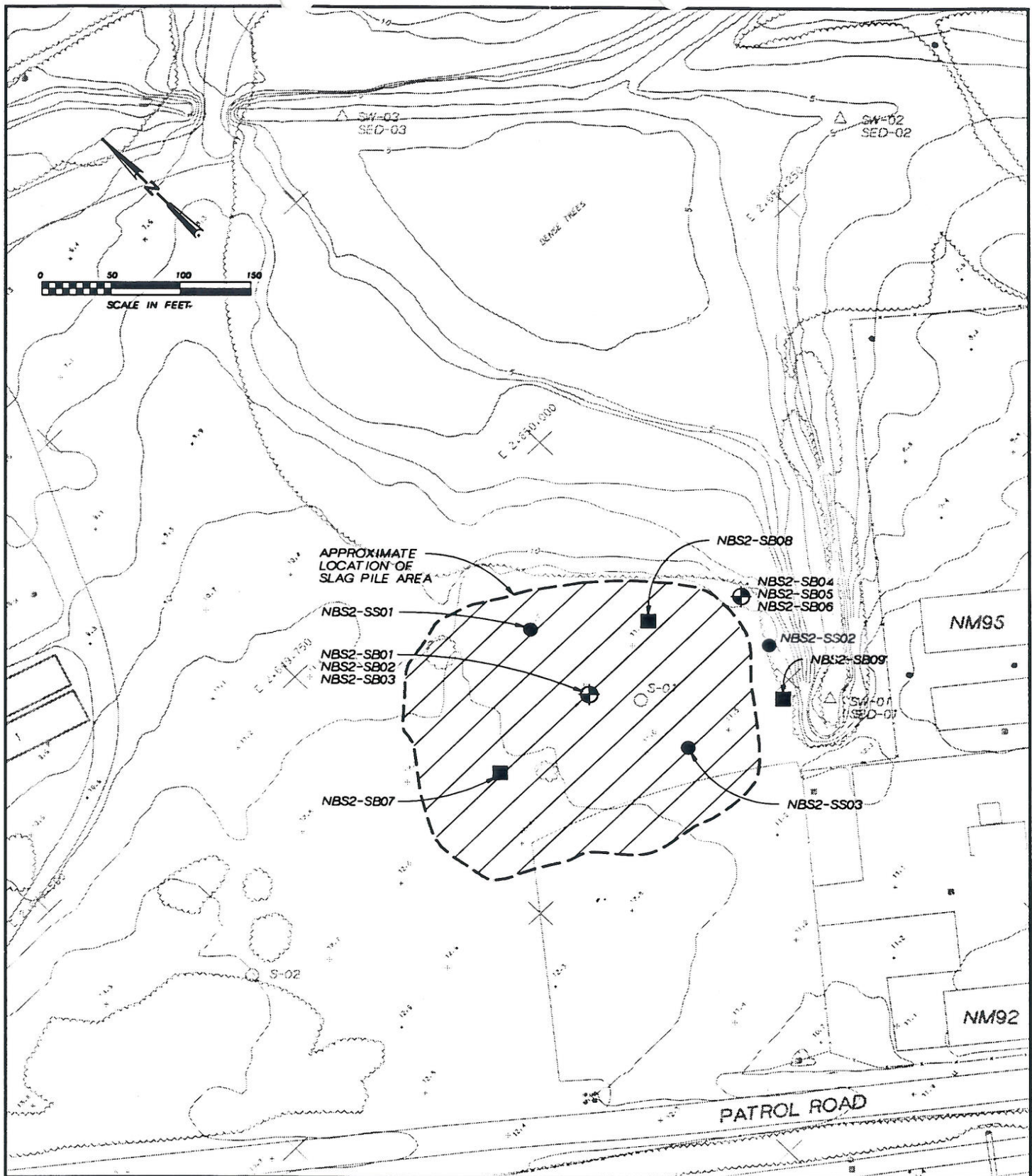
Air Sparging/Soil Vapor Extraction Pilot Test



(NOT TO SCALE)

FIGURE 4-2

Air Sparging/Soil Vapor Extraction Pilot Test
Cross-Section

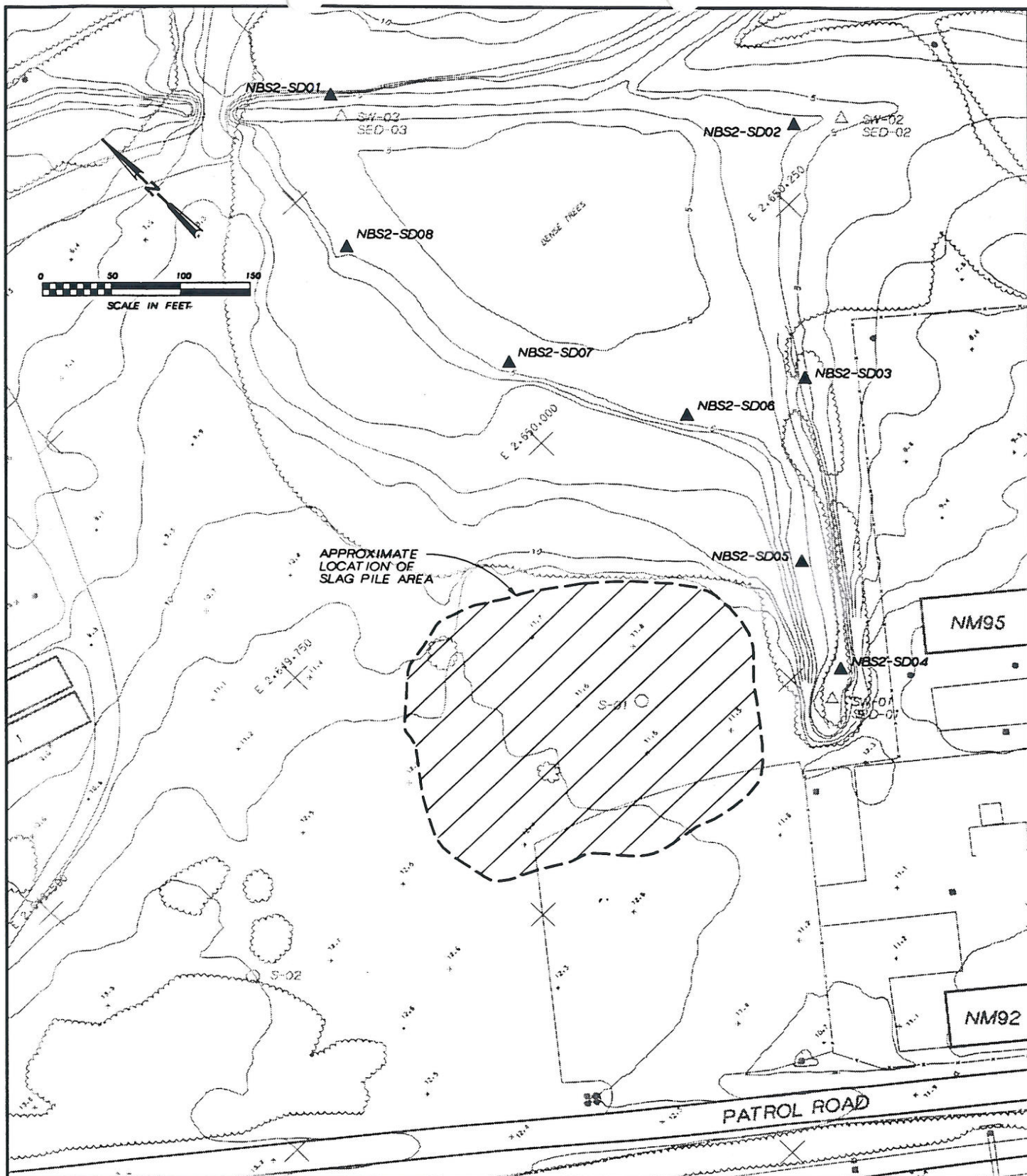


LEGEND

- SURFACE SOIL SAMPLING LOCATION
- COMPOSITE SOIL SAMPLING LOCATION
- ⊕ PROPOSED MONITORING WELL LOCATION
- MARCH 1988 APPROXIMATE SOIL SAMPLING LOCATION
- △ MARCH 1988 APPROXIMATE SURFACE WATER AND SEDIMENT SAMPLING LOCATION

Figure 1-1
PROPOSED SOIL
SAMPLING LOCATIONS
SITE 2 - NM AREA SLAG PILE
Naval Base, Norfolk



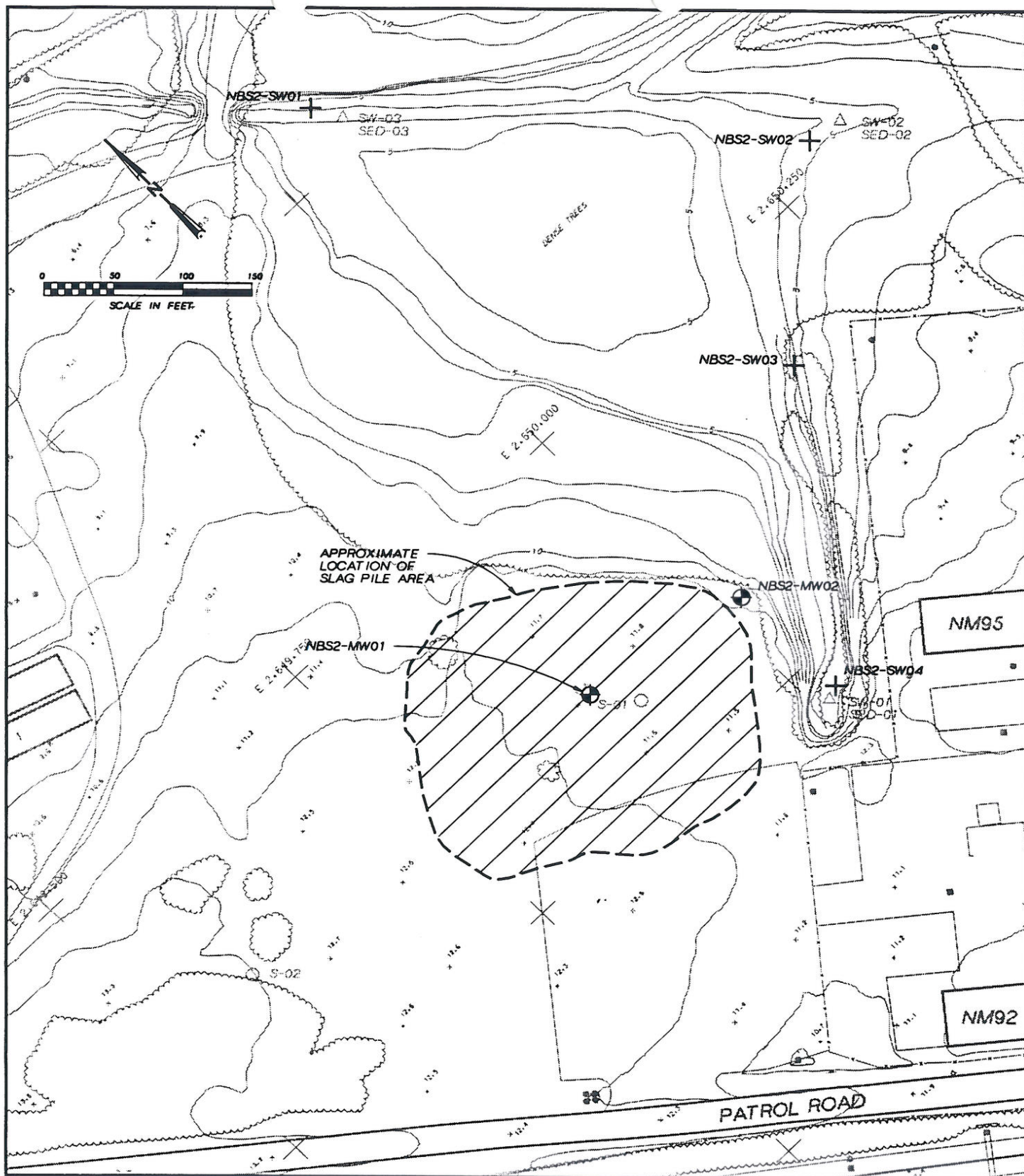


LEGEND

- ▲ SEDIMENT SAMPLING LOCATION
- MARCH 1988 APPROXIMATE SOIL SAMPLING LOCATION
- △ MARCH 1988 APPROXIMATE SURFACE WATER AND SEDIMENT SAMPLING LOCATION

Figure 1-2
PROPOSED SEDIMENT
SAMPLING LOCATIONS
SITE 2 - NM AREA SLAG PILE
Naval Base, Norfolk





LEGEND

- ⊕ SEDIMENT SAMPLING LOCATION
- ⊙ PROPOSED MONITORING WELL LOCATION
- MARCH 1988 APPROXIMATE SOIL SAMPLING LOCATION
- △ MARCH 1988 APPROXIMATE SURFACE WATER AND SEDIMENT SAMPLING LOCATION

Figure 1-3
 PROPOSED GROUNDWATER AND
 SURFACE WATER SAMPLING LOCATIONS
 SITE 2 - NM AREA SLAG PILE
 Naval Base, Norfolk

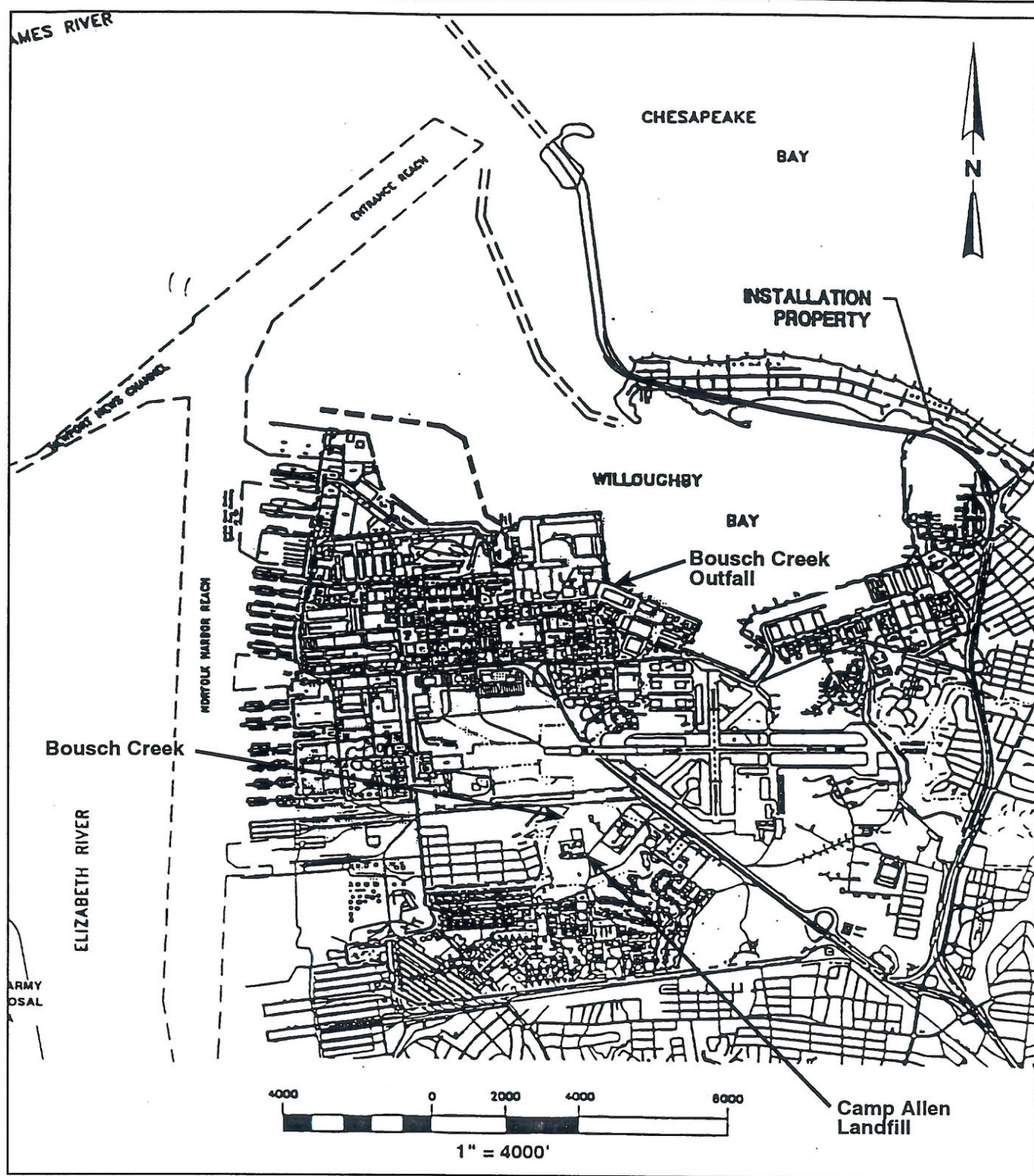


Table 1-2
SOIL AND SEDIMENT SAMPLING PROGRAM FOR SITE 2 - NM SLAG PILE RI/FS

Site	Sampling Location	TCL VOC	TCL SVOC	TCL Pest/PCB	TAL Metals and Cyanide (total)
Site 2	NNBS02-SS01	X	X	X	X
Site 2	NNBS02-SS02	X	X	X	X
Site 2	NNBS02-SS03	X	X	X	X
Site 2	NNBS02-SB01	X	X	X	X
Site 2	NNBS02-SB02	X	X	X	X
Site 2	NNBS02-SB03	X	X	X	X
Site 2	NNBS02-SB04	X	X	X	X
Site 2	NNBS02-SB05	X	X	X	X
Site 2	NNBS02-SB06	X	X	X	X
Site 2	NNBS02-SB07	X	X	X	X
Site 2	NNBS02-SB08	X	X	X	X
Site 2	NNBS02-SB09	X	X	X	X
Site 2	NNBS02-SD01	X	X	X	X
Site 2	NNBS02-SD02	X	X	X	X
Site 2	NNBS02-SD03	X	X	X	X
Site 2	NNBS02-SD04	X	X	X	X
Site 2	NNBS02-SD05	X	X	X	X
Site 2	NNBS02-SD06	X	X	X	X
Site 2	NNBS02-SD07	X	X	X	X
Site 2	NNBS02-SD08	X	X	X	X

**Table 1-3
GROUNDWATER AND SURFACE WATER SAMPLING PROGRAM FOR SITE 2 - NM SLAG PILE RI/FS**

Site	Sampling Location	Low Concentration VOC	TCL SVOC	Pest/PCB	TAL Metals and Cyanide (total)
Site 2	NNBS02-MW01	X	X	X	X
Site 2	NNBS02-MW02	X	X	X	X
Site 2	NNBS02-SW01	X	X	X	X
Site 2	NNBS02-SW02	X	X	X	X
Site 2	NNBS02-SW03	X	X	X	X
Site 2	NNBS02-SW04	X	X	X	X



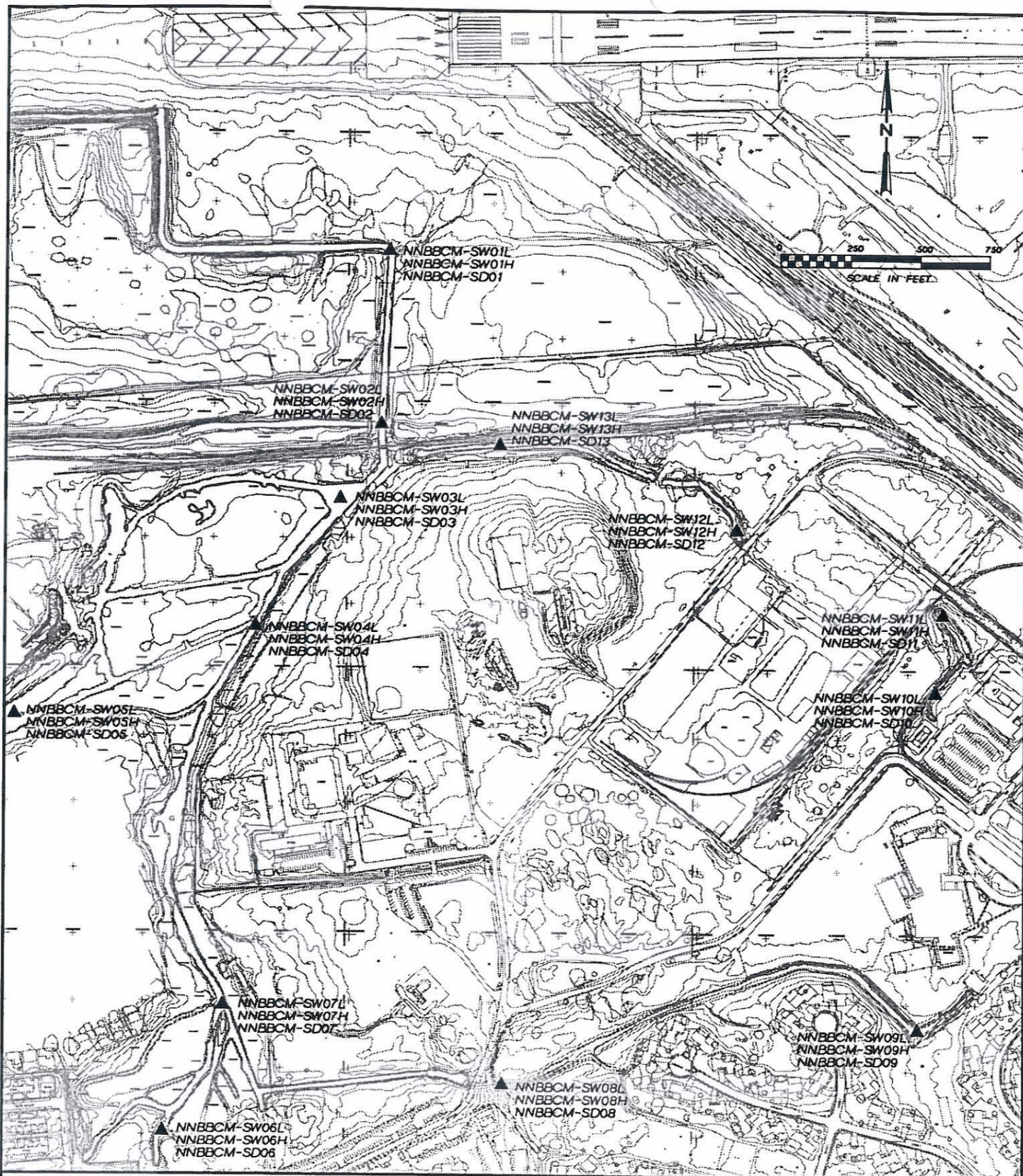
Legend

----- Installation Property Boundary

Source: USGS Topographic Map, Norfolk North Quadrangle, VA, photinspected 1989.

Figure 2-1
SITE LOCATION MAP
 Naval Base, Norfolk
 Norfolk, Virginia





LEGEND

▲ SURFACE WATER QUALITY
AND SEDIMENT SAMPLING
LOCATION

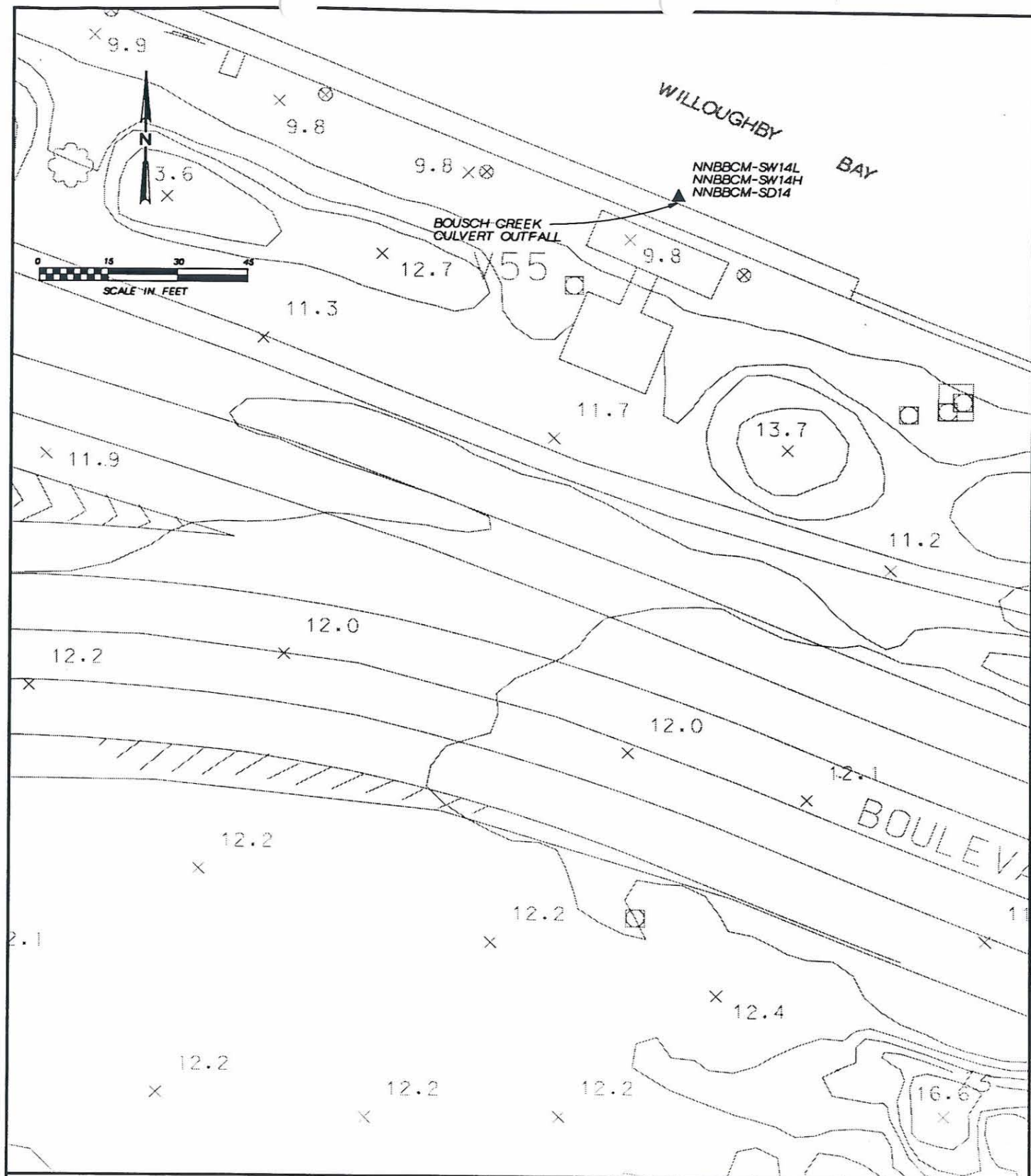
SW H SURFACE WATER - HIGH TIDE

SW L SURFACE WATER - LOW TIDE

SD SEDIMENT

Figure 4-1
PROPOSED SURFACE WATER QUALITY
AND SEDIMENT SAMPLING LOCATIONS
Naval Base, Norfolk





LEGEND

- ▲ SURFACE WATER QUALITY AND SEDIMENT SAMPLING LOCATION
- SW H SURFACE WATER - HIGH TIDE
- SW L SURFACE WATER - LOW TIDE
- SD SEDIMENT

Figure 4-2
PROPOSED SURFACE WATER QUALITY AND SEDIMENT SAMPLING LOCATIONS
 Naval Base, Norfolk



Table 4-1
SURFACE WATER AND SEDIMENT SAMPLING PROGRAM FOR POST REMEDIATION ECOLOGICAL MONITORING
CAMP ALLEN LANDFILL

Site	Sampling Location	Low Level Volatiles OLC02	TCL VOC	TCL SVOC	TCL Pest/PCB	TAL Metals and Cyanide (total)	Total Organic Carbon (TOC)	Grain Size
Bousch Creek	NNBBCM-SW01L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW01H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW02L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW02H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW03L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW03H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW04L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW04H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW05L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW05H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW06L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW06H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW07L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW07H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW08L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW08H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW09L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW09H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW10L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW10H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW11L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW11H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW12L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW12H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW13L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW13H	X		X	X	X	X	
Bousch Creek	NNBBCM-SW14L	X		X	X	X	X	
Bousch Creek	NNBBCM-SW14H	X		X	X	X	X	
Bousch Creek	NNBBCM-SD01		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD02		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD03		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD04		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD05		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD06		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD07		X	X	X	X	X	X

Table 4-1
SURFACE WATER AND SEDIMENT SAMPLING PROGRAM FOR POST REMEDIATION ECOLOGICAL MONITORING
CAMP ALLEN LANDFILL

Site	Sampling Location	Low Level Volatiles OLC02	TCL VOC	TCL SVOC	TCL Pest/PCB	TAL Metals and Cyanide (total)	Total Organic Carbon (TOC)	Grain Size
Bousch Creek	NNBBCM-SD08		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD09		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD10		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD11		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD12		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD13		X	X	X	X	X	X
Bousch Creek	NNBBCM-SD14		X	X	X	X	X	X

Table 2-2
SUMMARY OF SURFACE WATER SAMPLES FOR OFFSITE LABORATORY ANALYSIS

Matrix	Laboratory Parameter	Samples	Field Duplicates¹	Field Blanks²	Trip Blanks³	Matrix Spikes⁴	Equipment Blanks⁵	Matrix Total
Surface Water	Low Concentration VOC	28	3	1	2	0	1	35
	TCL Semivolatiles	28	3	1	0	1	1	34
	TCL Pesticides/PCBs	28	3	1	0	1	1	34
	TAL Metals	28	3	1	0	1	1	34
	TAL Cyanide	28	3	1	0	1	1	34
	TOC	28	3	1	0	1	1	34

Notes:

¹Field duplicates are collected at a frequency of 1 per 10.

²Field blanks are collected at a frequency of 1 per source per event (1 per week of sampling).

³Trip blanks are shipped with water samples submitted for volatiles analysis. Trip blanks are used to monitor contamination that could be introduced during transportation. Trip blanks are collected at a frequency of 1 per cooler of volatiles samples.

⁴Matrix spike/matrix spike duplicates (MS/MSD) are collected at a frequency of 1 per 20. MS/MSDs represent samples for which extra volume must be collected for the laboratory to perform required QC analyses. Triple the normal volumes will be collected for volatiles samples and double the normal volumes for inorganic samples.

⁵Equipment blanks are collected at a frequency of 1 per day and analyzed at a frequency of 1 every other day.

Note: This table is based on Navy Level D QA/QC requirements.

Table 2-4
SUMMARY OF SEDIMENT SAMPLES FOR OFFSITE LABORATORY ANALYSIS

Matrix	Laboratory Parameter	Samples	Field Duplicates ¹	Field Blanks ²	Trip Blanks ³	Matrix Spikes ⁴	Equipment Blank ⁵	Matrix Total
Sediment	TCL Volatiles	14	2	1	2	1	1	21
	TCL Semivolatiles	14	2	1	0	1	1	19
	TCL Pesticides/PCBs	14	2	1	0	1	1	19
	TAL Metals and Cyanide	14	2	1	0	1	1	19
	TOC	14	2	1	0	1	1	19
	Grain Size	14	2	0	0	0	0	16

Notes:

¹Field duplicates are collected at a frequency of 1 per 10.

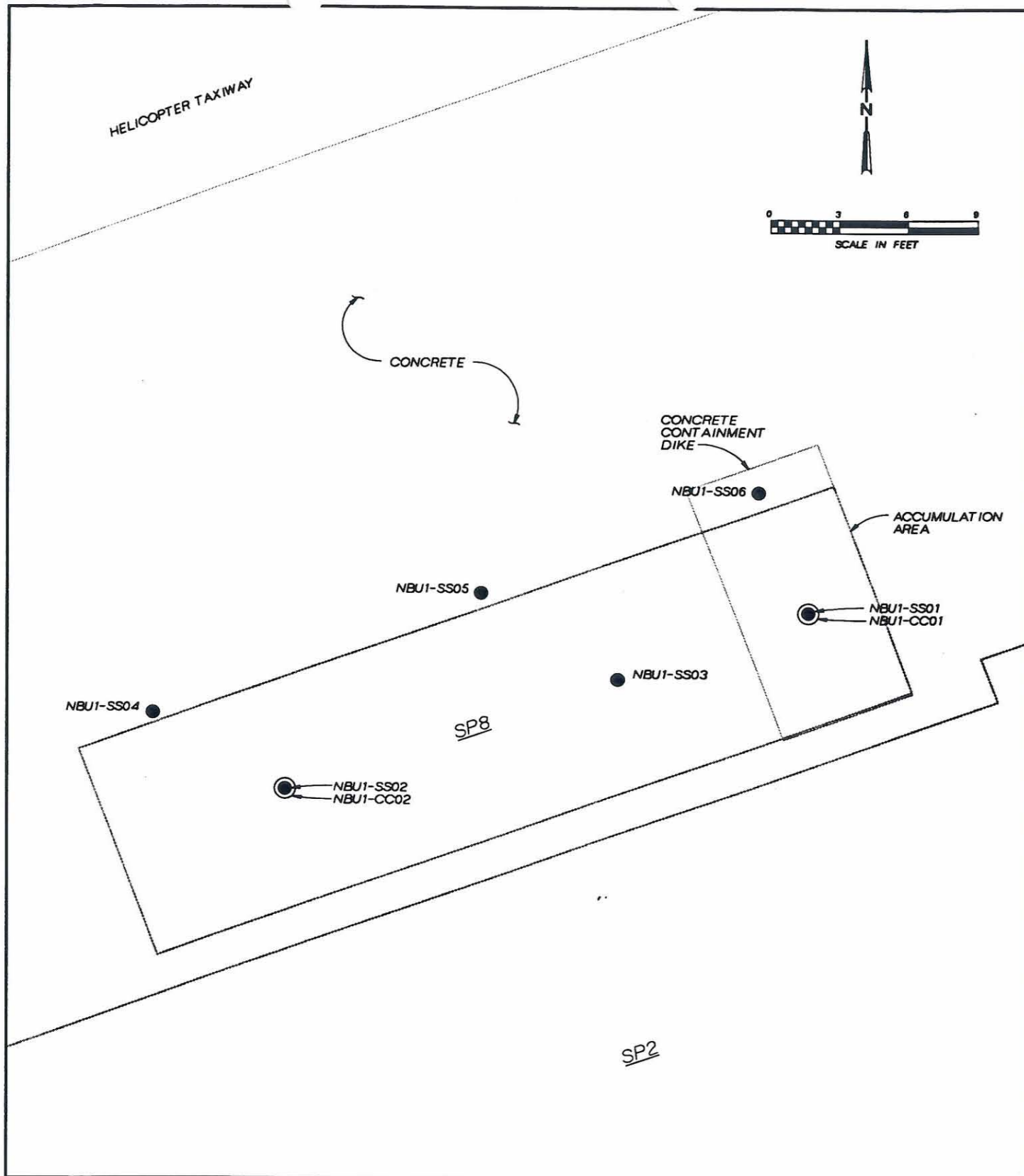
²Field blanks are collected at a frequency of 1 per source per event (1 per week of sampling).

³Trip blanks are shipped with samples submitted for volatiles analysis. Trip blanks are used to monitor contamination that could be introduced during transportation. Trip blanks are collected at a frequency of 1 per cooler of volatiles samples.

⁴Matrix spike/matrix spike duplicates (MS/MSD) are collected at a frequency of 1 per 20. MS/MSDs represent samples for which extra volume must be collected for the laboratory to perform required QC analyses. Triple the normal volumes will be collected for all analyses.

⁵Equipment blanks are collected at a frequency of 1 every other day.

Note: This table is based on Navy Level D QA/QC requirements.

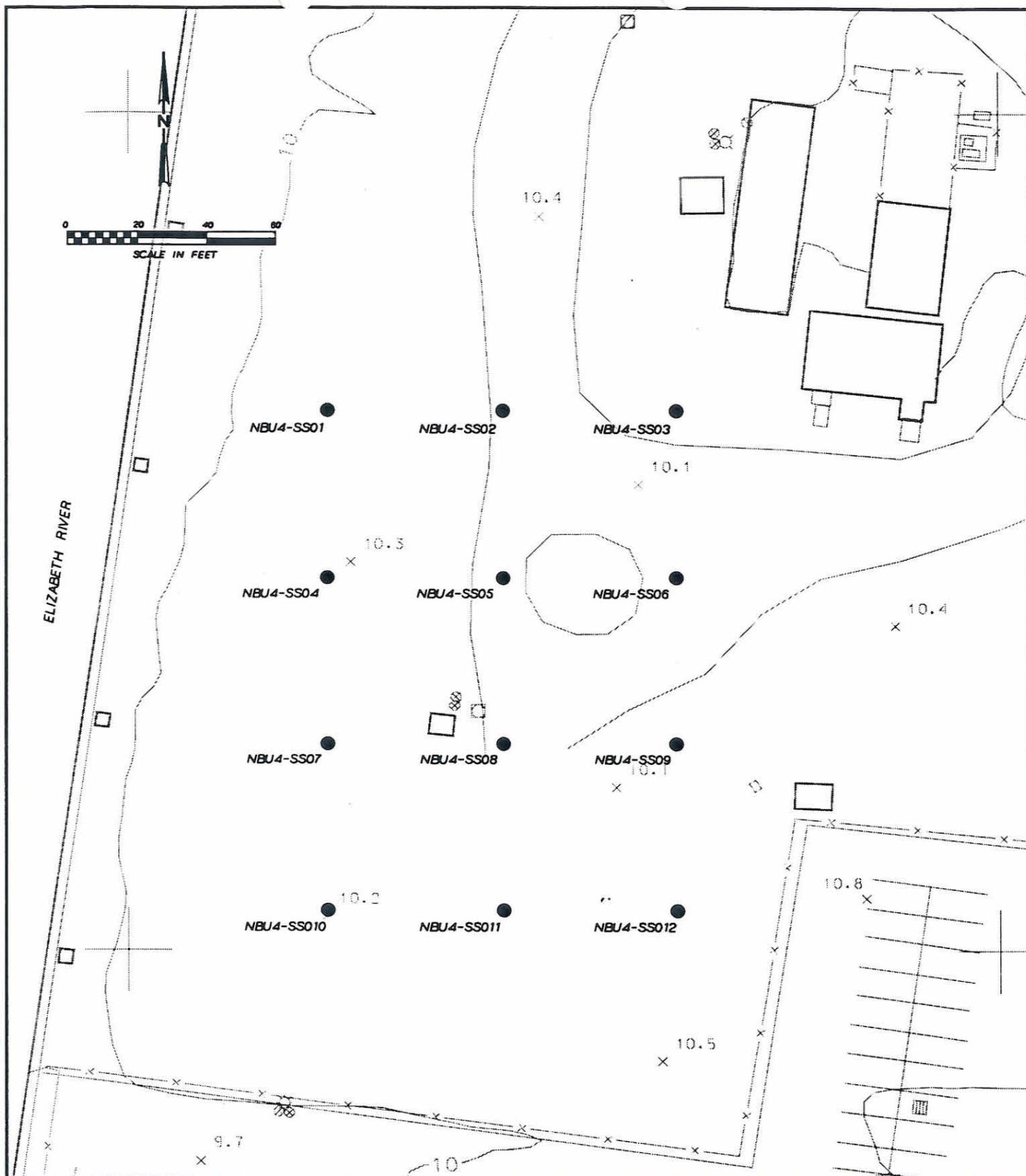


LEGEND

- SOIL SAMPLING LOCATION
- CONCRETE SAMPLING LOCATION

Figure 1-1
 PROPOSED CONCRETE AND SOIL
 SAMPLING LOCATIONS
 SWMU 01 - ACCUMULATION AREA
 Naval Base, Norfolk



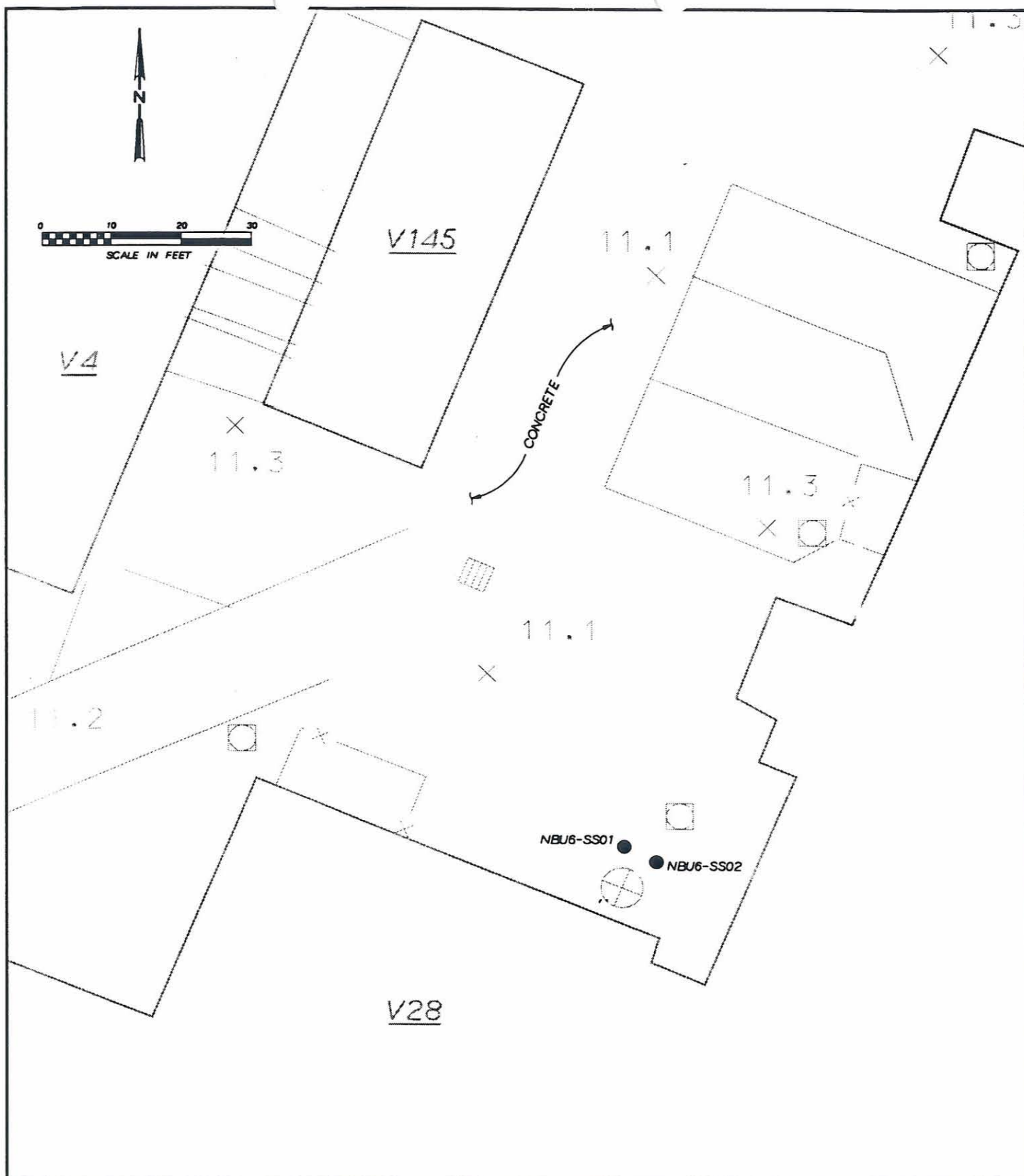


LEGEND

● SOIL SAMPLING LOCATION

Figure 1-2
 PROPOSED SOIL SAMPLING LOCATIONS
 SWMU 04 - SANDBLASTING OPERATIONS
 AND DISPOSAL AREA
 Naval Base, Norfolk





LEGEND



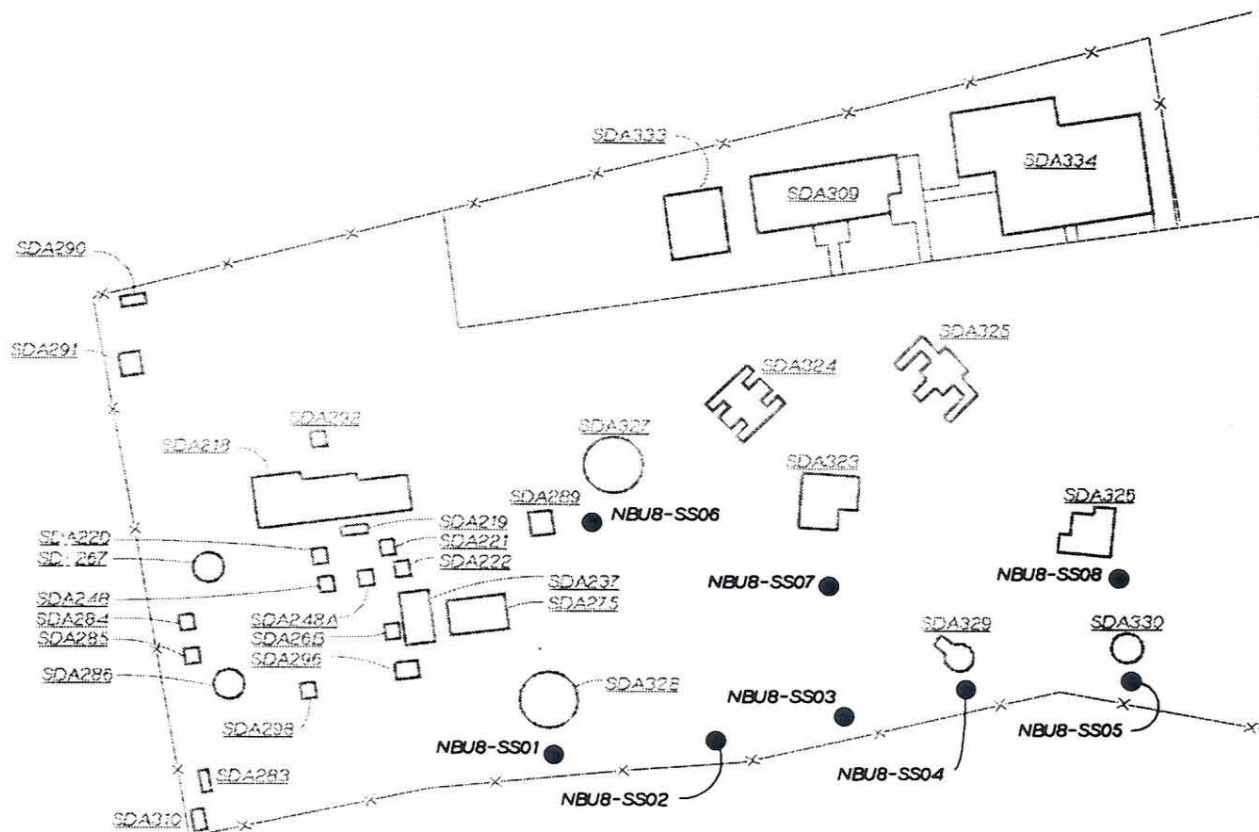
EXISTING WASTE DISPOSAL PIT

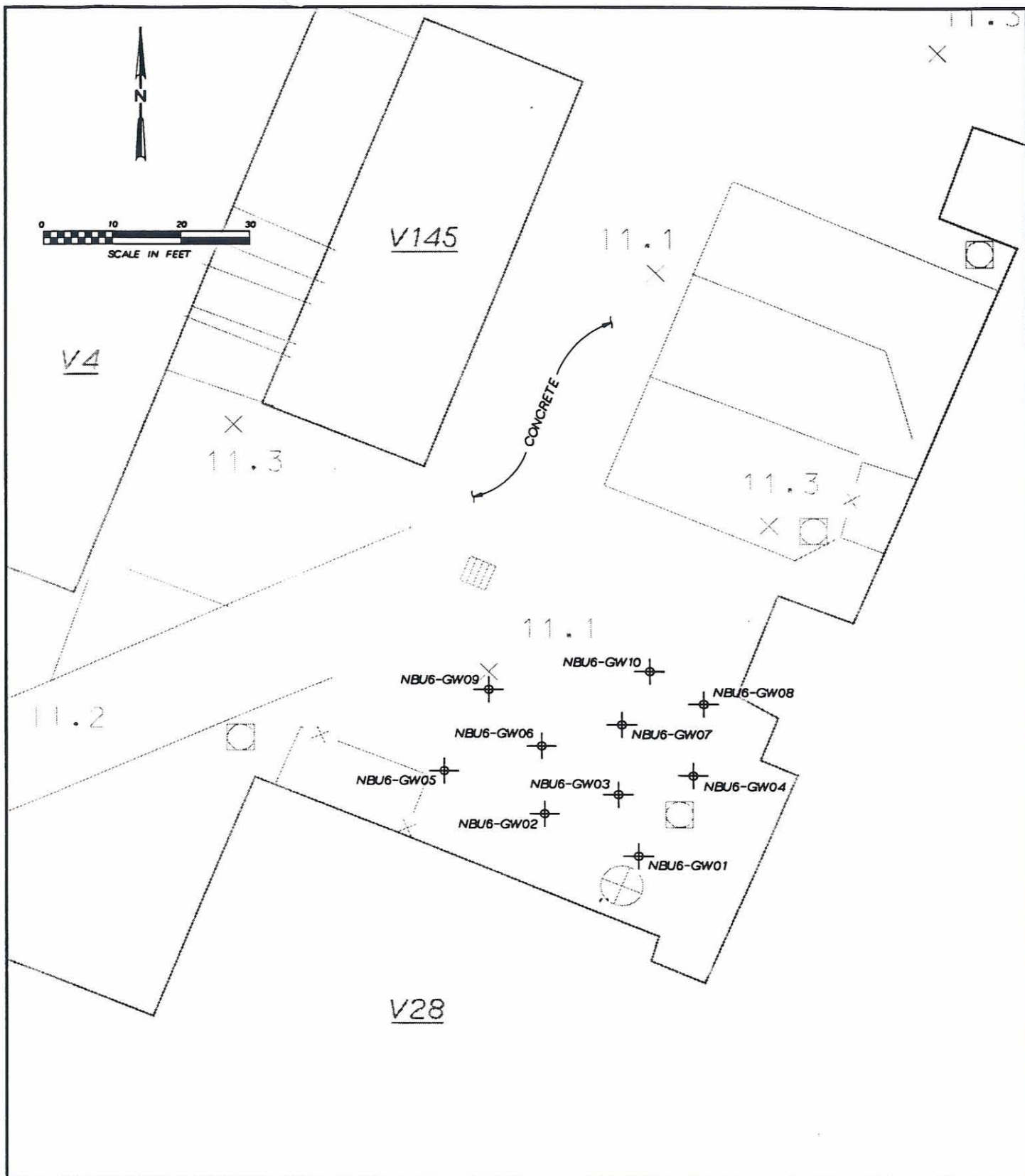


SOIL SAMPLING LOCATION

Figure 1-3
 PROPOSED SOIL SAMPLING LOCATIONS
 SWMU 06 - V28 WASTE DISPOSAL PIT
 Naval Base, Norfolk







LEGEND



EXISTING WASTE DISPOSAL PIT

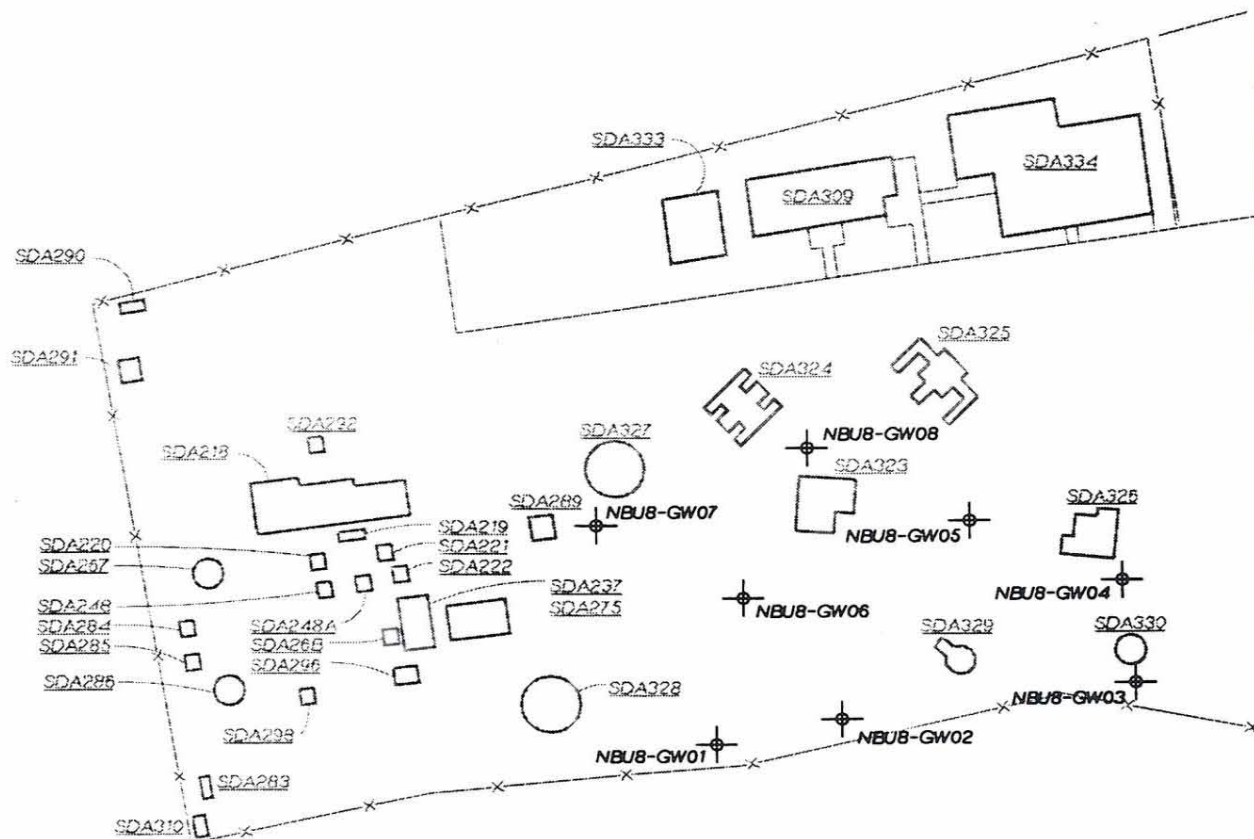
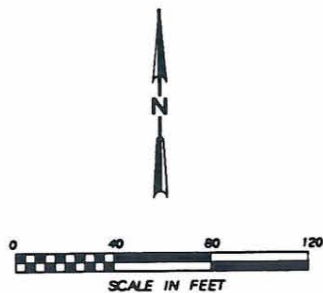


GEOPROBE GROUNDWATER SAMPLING LOCATION

PROPOSED GROUNDWATER SAMPLING LOCATIONS
SWMU 06 - V28 WASTE DISPOSAL PIT
Naval Base, Norfolk

Figure 1-5





LEGEND


 GEOPROBE GROUNDWATER
 SAMPLING LOCATION

Figure 1-6
 PROPOSED GROUNDWATER SAMPLING LOCATIONS
 SWMU 08 - FIREFIGHTING
 SCHOOL FACILITY
 Naval Base, Norfolk



Table 1-2
SOIL SAMPLING PROGRAM FOR SWMUs INVESTIGATION

Site	Sampling Location	TCL VOC	TCL SVOC	TCL PEST/PCB	TAL METALS AND CYANIDE (total)
SWMU 01	NNBU01-CC01	X	X	X	X
SWMU 01	NNBU01-CC02	X	X	X	X
SWMU 01	NNBU01-SS01	X	X	X	X
SWMU 01	NNBU01-SS02	X	X	X	X
SWMU 01	NNBU01-SS03	X	X	X	X
SWMU 01	NNBU01-SS04	X	X	X	X
SWMU 01	NNBU01-SS05	X	X	X	X
SWMU 01	NNBU01-SS06	X	X	X	X
SWMU 04	NNBU04-SS01	X	X	X	X
SWMU 04	NNBU04-SS02	X	X	X	X
SWMU 04	NNBU04-SS03	X	X	X	X
SWMU 04	NNBU04-SS04	X	X	X	X
SWMU 04	NNBU04-SS05	X	X	X	X
SWMU 04	NNBU04-SS06	X	X	X	X
SWMU 04	NNBU04-SS07	X	X	X	X
SWMU 04	NNBU04-SS08	X	X	X	X
SWMU 04	NNBU04-SS09	X	X	X	X
SWMU 04	NNBU04-SS10	X	X	X	X
SWMU 04	NNBU04-SS11	X	X	X	X
SWMU 04	NNBU04-SS12	X	X	X	X
SWMU 06	NNBU06-SS01	X	X	X	X
SWMU 06	NNBU06-SS02	X	X	X	X
SWMU 08	NNBU08-SS01	X	X	X	X
SWMU 08	NNBU08-SS02	X	X	X	X
SWMU 08	NNBU08-SS03	X	X	X	X
SWMU 08	NNBU08-SS04	X	X	X	X
SWMU 08	NNBU08-SS05	X	X	X	X
SWMU 08	NNBU08-SS06	X	X	X	X
SWMU 08	NNBU08-SS07	X	X	X	X
SWMU 08	NNBU08-SS08	X	X	X	X

**Table 1-3
GROUNDWATER SAMPLING PROGRAM FOR SWMUs INVESTIGATION**

Site	Sampling Location	TCL VOC	TCL SVOC	PEST/PCB	TAL METALS AND CYANIDE (TOTAL)
SWMU 06	NNBU06-MW02	X	X	X	X
SWMU 06	NNBU06-MW03	X	X	X	X
SWMU 06	NNBU06-GW01	X	X	X	X
SWMU 06	NNBU06-GW02	X	X	X	X
SWMU 06	NNBU06-GW03	X	X	X	X
SWMU 06	NNBU06-GW04	X	X	X	X
SWMU 06	NNBU06-GW05	X	X	X	X
SWMU 06	NNBU06-GW06	X	X	X	X
SWMU 06	NNBU06-GW07	X	X	X	X
SWMU 08	NNBU08-GW01	X	X	X	X
SWMU 08	NNBU08-GW02	X	X	X	X
SWMU 08	NNBU08-GW03	X	X	X	X
SWMU 08	NNBU08-GW04	X	X	X	X
SWMU 08	NNBU08-GW05	X	X	X	X
SWMU 08	NNBU08-GW06	X	X	X	X
SWMU 08	NNBU08-GW07	X	X	X	X
SWMU 08	NNBU08-GW08	X	X	X	X